

but the original state of each altered page is not directly recorded in a historic log, but instead, a record is additionally logged of the locations of the swapped data so that an image of the OS visible data can be reconstructed prior to the time of the de-fragmentation by knowing what data to effectively re-swap and what OS mapping data to effectively restore.

6. (Amended) An apparatus comprising a machine readable medium having computer instructions embodied therein, the instructions comprising:

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Amended
determining what pages should be swapped among the various allocations made by an operating system (OS), the OS's file system mapping updated to reflect the swapped pages and a history of the original state prior to any update recorded by an engine,

wherein the swaps are performed by one of manipulation of the engine's data structures and actually exchanging data on the disk where OS visible data is read and written, but the original state of each altered page is not directly recorded in a historic log, but instead, a record is additionally logged of the locations of the swapped data so that an image of the OS visible data can be reconstructed prior to the time of the de-fragmentation by knowing what data to effectively re-swap and what OS mapping data to effectively restore; and

incorporating desired close proximity information of various OS visible pages into an algorithm executed by the engine that determines what is actually swapped, in order to reasonably maintain physical close proximity of data allocated by the OS but physically re-mapped by the engine.

9. A method according to claim 4, wherein the historical data is maintained by diverting writes to a different position on the disk so historical data remains in its original location.

REMARKS

Preliminary amendments have been made to the claims to improve the readability. All amendments are supported by the specification as filed in PCT Application PCT/US00/18732, from which this national U.S. filing claims priority.

After this amendment, there are 7 claims in total, 3 of which are independent. Claims 7 and 8 were canceled.

The Applicants submit that the pending claims are in condition for allowance. If the Examiner has any questions concerning the present amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6903. If any fees are due in connection with filing this amendment, the Commissioner is authorized to charge Deposit Account No. 50-0805 (Order No. ROXIP183). A duplicate copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

<u>In re</u> the application of)	
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E. Schneider)	Group: Unknown
)	
Application No: Unassigned)	Examiner: Unassigned
)	
Filed: May 17, 2001)	Atty. Docket No: ROXIP183
)	
For: <u>DISK STORAGE DEFRAGMENTATION</u>)	Date: May 17, 2001
)	

MARKED UP CLAIMS

1. (Amended) A method of de-fragmenting file allocations on a disk comprising:

determining what pages should be swapped among the various allocations made by [the] an operating system (OS), the OS's file system mapping updated to reflect the swapped pages and a history of the original state prior to any update recorded by [the] an engine,

wherein the swaps performed by manipulation of the engine's data structures and/or actually exchanging data on the disk where OS visible data is read and written but the original state of each altered page is not directly recorded in [the] a historic log, but instead, a record is additionally logged of the locations of the swapped data so that an image of the OS visible data can be reconstructed prior to the time of the de-fragmentation by knowing what data to effectively re-swap and what OS mapping data to effectively restore.

2. (Amended) A method according to claim 1 wherein the method is performed on a computer wherein a history of data is maintained such [the] that the computer can be returned to a state of data from an earlier point in time.

3. (Amended) A method of de-fragmenting file allocations on a disk according to claim 1, including the step of incorporating desired close proximity information of various OS visible pages into [the] an algorithm executed by the engine that determines what is actually swapped, in order to reasonable maintain physical close proximity of data allocated by the OS but physically re-mapped by the engine.

4. (Amended) A method according to claim 3 wherein the method is performed on a computer wherein a history of data is maintained such [the] that the computer can be returned to a state of data from an earlier point in time.

5. (Amended) An apparatus comprising a machine readable medium having computer instructions embodied therein, [wherein] the instructions comprising:

determining what pages should be swapped among the various allocations made by an operating system (OS), the OS's file system mapping updated to reflect the swapped pages and a history of the original state prior to any update recorded by an engine,

wherein the swaps are performed by one of manipulation of the engine's data structures and actually exchanging data on the disk where OS visible data is read and written, but the original state of each altered page is not directly recorded in a historic log, but instead, a record is additionally logged of the locations of the swapped data so that an image of the OS visible data can be reconstructed prior to the time of the de-fragmentation by knowing what data to effectively re-swap and what OS mapping data to effectively restore.

6. (Amended) An apparatus comprising a machine readable medium having computer instructions embodied therein, [wherein] the instructions [carry out the method of claim 3 when executed on a suitable configured computer] comprising:

determining what pages should be swapped among the various allocations made by an operating system (OS), the OS's file system mapping updated to reflect the swapped pages and a history of the original state prior to any update recorded by an engine,

wherein the swaps are performed by one of manipulation of the engine's data structures and actually exchanging data on the disk where OS visible data is read and written, but the original state of each altered page is not directly recorded in a historic log, but instead, a record is additionally logged of the locations of the swapped data so that an image of the OS visible data can be reconstructed prior to the time of the de-fragmentation by knowing what data to effectively re-swap and what OS mapping data to effectively restore; and

incorporating desired close proximity information of various OS visible pages into an algorithm executed by the engine that determines what is actually swapped, in order to

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reasonably maintain physical close proximity of data allocated by the OS but physically re-mapped by the engine.